Treatability Study Work Plan for the Segmented Gate System Technology Deployment

1. INTRODUCTION

1.1 Purpose

The purpose of this Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) treatability study work plan is the demonstration of the segmented gate system technology to effectively remediate radionuclide-contaminated soils at selected Idaho National Engineering and Environmental Laboratory (INEEL) sites. The ultimate goal of the treatability study is to separate radionuclide-contaminated soils, under varying conditions, from clean soils using the Thermo NUtech segmented gate system. This treatability study involves the excavation, stockpiling, sampling, loading, and transporting of radionuclide-contaminated soils from the Auxiliary Reactor Area (ARA)-12, ARA-23, ARA-25, Boiling Water Reactor Experiment (BORAX)-I, Stationary Low-Power Reactor (SL)-1, and selected Idaho Nuclear Technology and Engineering Center (INTEC) sites at the INEEL. Information obtained from the study will be used to validate the volume reduction potential for various contaminant depositional forms (windblown, sediments, etc.) and to validate operational costs for the segmented gate system. Following separation, the soils that are below the treatability standard for a specific site will be returned to that site. The soils that exceed the defined treatability standard will be consolidated at a facility appropriate for the types and levels of contamination encountered.

Contaminated soils may be consolidated at various locations including but not limited to the Radioactive Waste Management Complex (RWMC) located at the INEEL. It is anticipated that the treatability study will be performed during May and June 1999. The sampling and analyses will be specific to the consolidation facility's waste acceptance criteria

Funding for the fieldwork will be provided by the U.S. Department of Energy (DOE) Headquarters, Environmental Management (EM)-50 Office, under the Accelerated Site Technology Deployment Program.

1.2 Objectives

Overall project objectives for radionuclide-contaminated soils at the INEEL are as follows:

- Segregate excavated soils to the specified treatability standards as the indicator of success for the treatability study
- Successfully deploy the use of the Thermo NUtech segmented gate system to process a minimum of 765 m^3 (1,000 yd^3) of radionuclide-contaminated soils
- Determine the percent volume reduction using the Thermo NUtech segmented gate system on the various types of depositional modes
- Determine cost effectiveness of the Thermo NUtech segmented gate system as it applies to the Waste Area Group (WAG) 5 feasibility study and other INEEL candidate soils.

The detailed operational objectives of this treatability study include:

- Perform removal and transportation of radionuclide-contaminated soil using the most efficient, safe method possible
- Select the appropriate packaging and transportation methods that mitigate spread of radioactive airborne particulates
- Complete the project with no safety, industrial hygiene, environmental, or radiological incidents
- Identify proper waste management options for treated soils.

1.3 Specific Treatability Study Objectives

There are four main objectives associated with the segmented gate system treatability study. These include the following:

1. Test the system using sediment-type deposits contaminated with Cs-137
2. Test the system on windblown depositional-type radionuclide contamination
3. Test the system on spill depositional-type radionuclide contamination
4. Validate the feasibility study cost estimate for processing soils with the segmented gate system.

The intent of testing the system using sediment-type deposits contaminated with Cs-137 is to determine the volume reduction potential associated with the system and to determine the operational efficiency of the system. Although this treatability study is concerned primarily with Cs-137, it is being used as an indicator assuming that other radionuclides will follow the same pattern of assocation with particulates. Validation of operational efficiency will include maintaining operating logbooks for the system and recording the number of operating hours, time that the system is down for routine scheduled maintenance, and unplanned maintenance. To minimize soil handling, the system will be deployed at ARA-I, the site of the majority of the windblown soils to be treated.

In an effort to test the systems effectiveness in separating windblown depositional-type radionuclide contamination, three separate tests are planned. The first two tests are to determine whether excavation methods affect the efficiency with which the system separates soil. These two tests will be performed on single intermodals (13 m^3 [17 yd^3]) obtained from adjacent soil plots. Prior to excavation, samples will be collected from each plot to provide baseline Cs-137 data against which data obtained post segregation can be compared. The first plot will be excavated by windrowing the soil then loading direct into the segmented gate system unit. This plot will act as the test control. The second plot will be excavated by first windrowing the soil followed by loading the soil into a truck for transport to a stockpile then loading the soil from the stockpile into the segmented gate system unit. It is believed that the second excavation method will have the effect of homogenizing the soil, thus affecting the system's ability to segregate soil, ultimately reducing the efficiency with which the system operates. The third test will be to determine the efficiency with which the system segregates contaminated vegetation found at the task site. Determination of the efficiency of the system under the given conditions will be measured in terms of the measured volume reduction. The system's detectors operate at a 95% confidence level based upon various factors specific to the site where the system is deployed.

Finally, it is desired to validate the feasibility study cost estimate assumptions for processing soils using the segmented gate system during a simulated production run using the anticipated remedial design/remedial action excavation method. If it is determined that there are unrealized cost savings to be experienced by implementing this segregation methodology rather than other methods of remediation, the segmented gate system technology may become a viable alternative for consideration at WAG 5 and possibly other sites at the INEEL. Figure 1-1 provides a flow diagram of the proposed treatability study tests.

1.4 Background

The INEEL, formerly the National Reactor Testing Station (NRTS), encompasses 2,305 km^2 (890 mi^2), and is located approximately 58 km (34 mi) west of Idaho Falls, Idaho (see Figure 1-2).

The United States Atomic Energy Commission, now the DOE, established the NRTS (INEEL) in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been the storage facility for transuranic (TRU) radionuclides and low-level radioactive waste since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The DOE Idaho Operations Office (DOE-ID) has responsibility for the INEEL, and designated authority to operate the INEEL to government contractors. Lockheed Martin Idaho Technologies Company, Inc. (LMITCO), the current primary contractor for DOE-ID at the INEEL, provides managing and operating services to the majority of INEEL facilities.

1.4.1 Regulatory Framework

The segmented gate system treatability study is a CERCLA action being conducted as per the requirements set forth in the *Guide for Conducting Treatability Studies under CERCLA-Final* (U.S. Environmental Protection Agency [EPA] 1992) under Operable Unit (OU) 5-12. Of the seven sites under consideration for inclusion in the treatability study, two (BORAX-I and SL-1) have previously been remediated under terms of the Record of Decision (ROD), *Record of Decision for Stationary Low-Power Reactor-1 Operable Unit 5-05 and Boiling Water Reactor Experiment-I Burial Grounds Operable Unit 6-01 and 10 No Action Sites (Operable Unit 5-01, 5-03, 5-04, and 5-11)* (DOE-ID 1996a). These two sites are being included in the treatability study to provide information that will be evaluated by the project with agency concurrence for possible inclusion in a future action.

Site ARA-25 is a newly identified potential waste site not originally identified in the Federal Facility Agreement and Consent Order (FFA/CO) Action Plan, but has recently been approved as a new site. It along with ARA-12 and ARA-23 will be included under terms of the OU 5-12 ROD scheduled to be signed September 1999 in accordance with the FFA/CO. The OU 5-12 proposed plan is scheduled for public comment beginning in April 1999 and informs the public that the segmented gate system technology will be evaluated in the ROD and incorporate results of the treatability study.

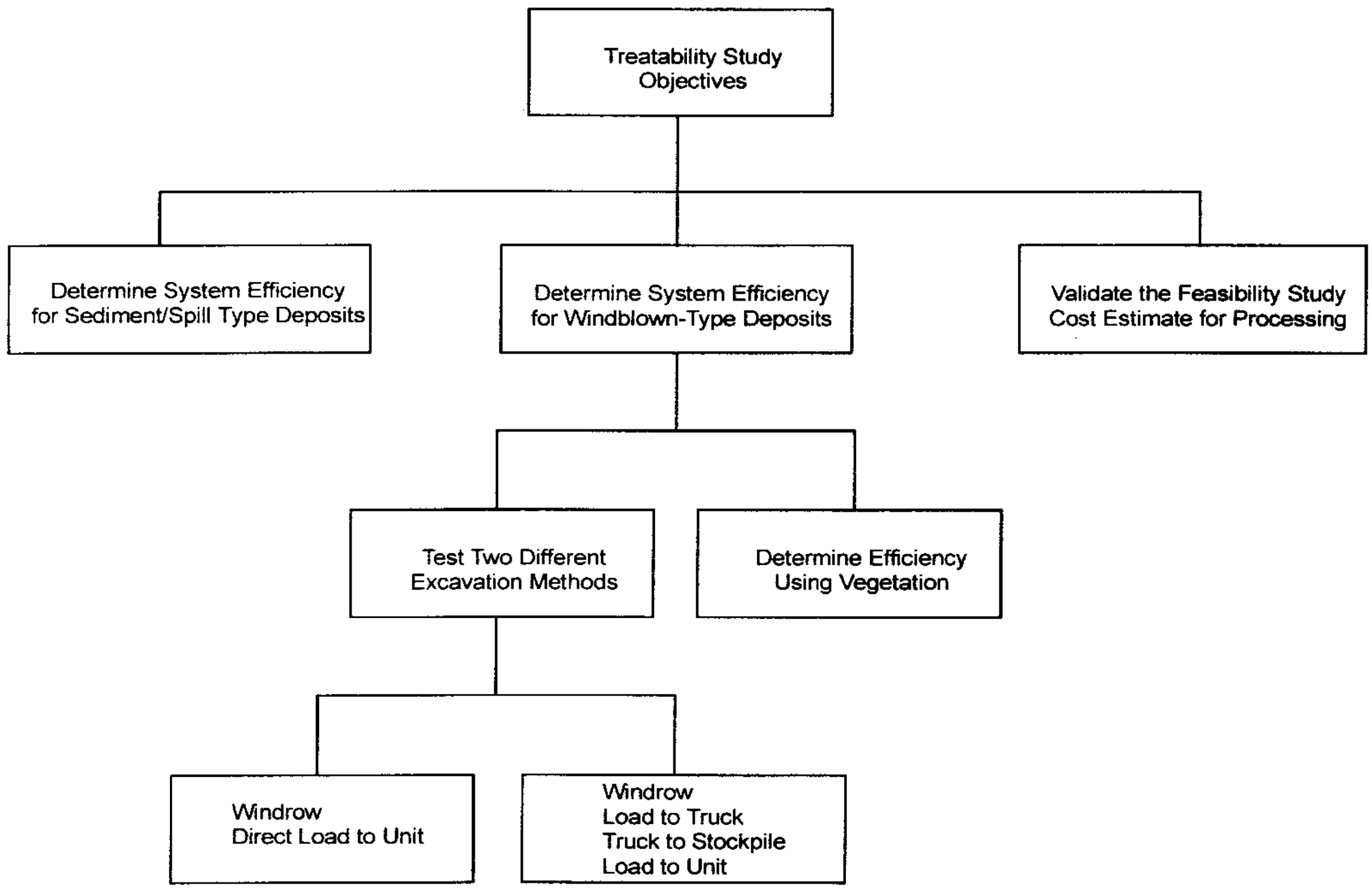

Figure 1-1. Treatability study objectives flow diagram.

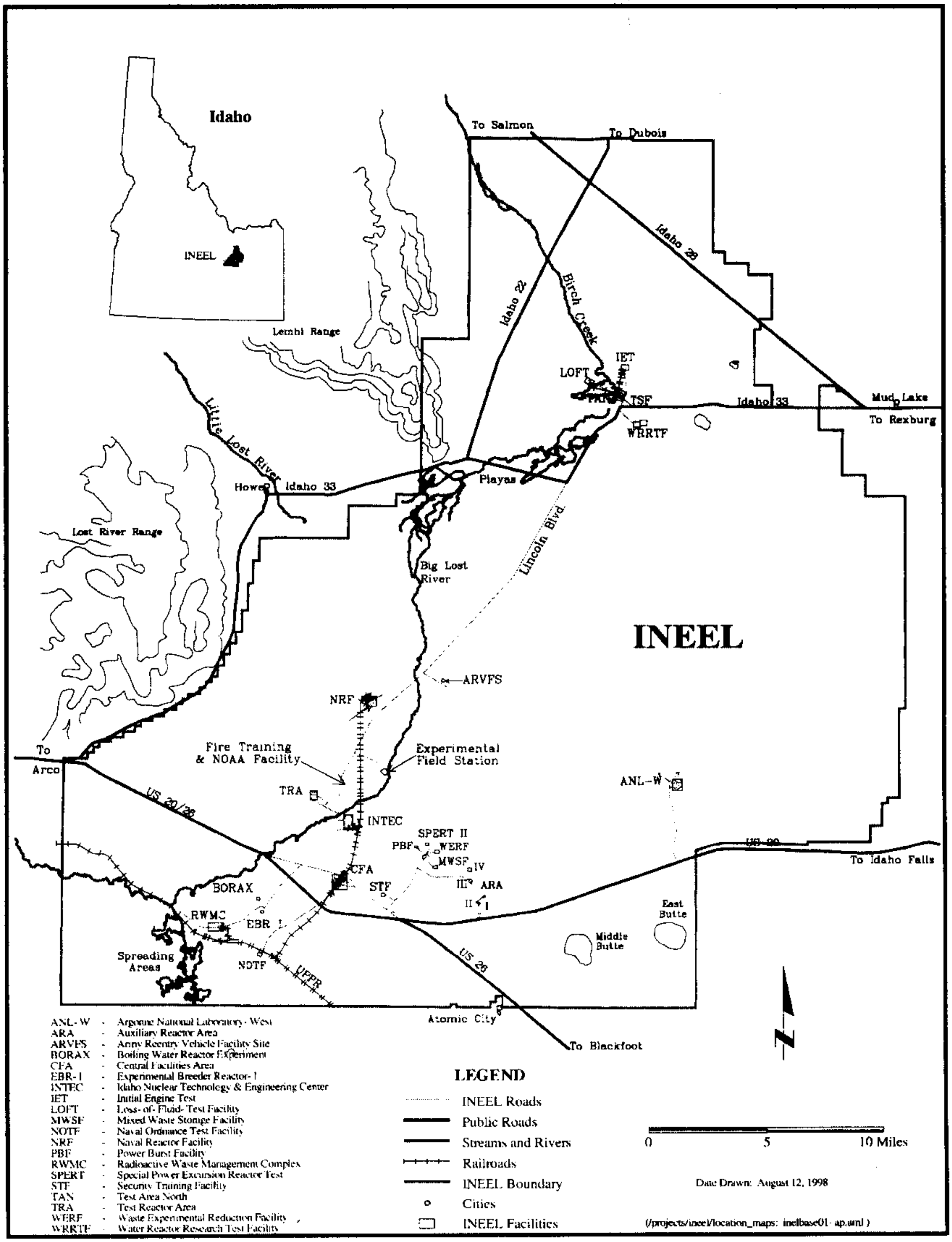

Figure 1-2. Physical location of sites within the INEEL.

For the INTEC sites (CPP-03 and CPP-10), the proposed plan, *Proposed Plan for Waste Area Group 3 at the Idaho Chemical Processing Plant Idaho National Engineering and Environmental Laboratory* (DOE-ID 1998a) is currently available for public comment with the ROD scheduled to be signed in July 1999. However, the ROD does not evaluate the segmented gate system technology. Soils from the WAG 3 sites will be used in the OU 5-12 treatability study to provide a variety of feed materials. If the technology proves cost effective for the WAG 3 soils, a change to the remedy would have to be addressed in the future.

1.4.2 Site Selection Criteria

If it is determined that a site contains characteristic hazardous waste, the segmented gate system will not be deployed to treat soils from that site. In addition, if the site contains listed hazardous waste (i.e., ARA-25), the segment gate system will only be deployed if a no-longer contained-in determination is obtained in time to support the treatability study.

All sites will be surveyed with hand-held field instrumentation to ensure that at least one-half of each intermodal collected for treatment is contaminated. If not, either soils from that site will not be included in the treatability study (if only one intermodal is to be treated) or the intermodal will be replaced.

Screening of soils prior to excavation will be performed using an SC-132 hand-held gamma scintillation instrument. The background will be established for each site, and the SC-132 used with its audio alarm set approximately 30% above background. This allows for natural variations in the background, but provides for the detection of areas that are above background. Based on the evaluation of trial survey data, the 30% above background corresponds to concentrations of approximately 15 pCi/g based upon Cs-137.

Hazardous waste determinations will be completed for each site prior to excavation or treatment. If analytical data needs to be collected to support the hazardous waste determination (i.e., metals at ARA-12), data will need to be received by May 1, 1999 in order to meet the targeted hazardous waste determination approval date. The majority of the hazardous waste determinations will be completed assuming that available data is sufficient to obtain approval of the determinations. If available data does not support the hazardous waste determination, the site will be excluded from the treatability study.

1.5 Work Site Description

The *INEL Consent Order and Compliance Agreement* (INEL 1987) was entered into between DOE and the EPA pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h) in August 1987. The Consent Order and Compliance Agreement required DOE to conduct an initial assessment and screening of all solid waste and/or hazardous waste disposal units at the INEEL and set up a process for conducting any necessary corrective actions. On July 14, 1989, the INEEL was proposed for listing on the National Priorities List (NPL) (54 Federal Register [FR] 29820). The listing was proposed by the EPA, under the authorities granted to the EPA by CERCLA as amended by the Superfund Amendments and Reauthorization Act of 1986. The final rule that listed the INEEL on the NPL was published on November 21, 1989 in 54 FR 44184. As a result of the INEEL's listing on the NPL, DOE, EPA, and the Idaho Department of Health and Welfare (IDHW) entered into the FFA/CO on December 9, 1991. Under the FFA/CO, the INEEL is divided into 10 WAGs. The work addressed by this technology deployment is located in WAGs 3, 5, and 6.

Multiple sites containing low-level radionuclide-contaminated soils are being included as potential sources of feed material for the segmented gate system. This is to allow for maximum flexibility for studying the volume reduction potential on a variety of soils and depositional types. Also, some of the sites currently have regulatory issues or sampling deficiencies that may preclude their use. As noted in each of the site descriptions, Cs-137 has been detected at concentrations exceeding the defined cleanup levels. Each of these sites was chosen because the primary radionuclide contamination is Cs-137.

1.5.1 ARA-12: ARA-III Radioactive Waste Leach Pond

The ARA-12 site is a 5,748-m^2 (1.4-acre) unlined surface impoundment constructed in a natural depression west of ARA-III across Wilson Boulevard (see Figure 1-3). The ARA-III facility was an active reactor research facility from about 1959 to 1965. The pond was constructed to receive low-level liquid waste from reactor research operations. Liquid waste was stored temporarily in tanks, then transferred to the leach pond via an underground pipe. Effluent contained chromium, used in solutions to inhibit algae growth, and minute amounts of low-level radioactive material. A second, separate line to the leach field originated in an uncontaminated water storage tank (ARA-709). A third source of effluent was facility runoff via a culvert. From 1966 to 1987, activities at ARA-III were limited to component and instrumentation testing, instrument development and fabrication, and chemical research. No known waste was disposed in the leach pond associated with these activities. In 1991, the culvert was plugged in preparation for decontamination and dismantlement (D&D) operations at ARA-III. The tanks and waste lines to the leach pond were removed in 1993 during the D&D of ARA-III.

Performance of treatability studies on soils at the ARA-12 site will depend on whether sample results show that the soils are not RCRA-characteristic and that the soils are contaminated with gamma-emitting radionuclides at concentrations exceeding the treatability standards. In addition, sampling for beta emitters will also be performed to determine acceptability of this site. Sampling and analysis necessary to make this determination is planned for early Spring 1999. Analytical results must be received from the laboratory by June 1, 1999, if a determination is to be made as to whether ARA-12 soils are RCRA-characteristic in order to support the treatability study. If the soils meet these criteria, approximately 153 m^3 (200 yd^3) will be treated. This soil will represent the first depositional mode—sediment. The highest Cs-137 concentration measured by the Global Positioning Radiometric Scanner (GPRS) measurement system was 308 pCi/g at the southwest corner of the pond outside of the site boundary.

1.5.2 ARA-23: Radionuclide-Contaminated Surface Soils Around ARA-I and ARA-II

The ARA-23 site is defined as the subsurface structures (e.g., reactor foundation and underground utilities) and contamination within the ARA-II facility fence (see Figure 1-4). The area is about 169,000 m^2 (41.8 acres) and also includes all surface soils within the radionuclide-contaminated soil fence encompassing the ARA-I and ARA-II facilities.

Constructed in about 1957, ARA-I supported the SL-1 operations located in the adjacent ARA-II facility. Over the years, services offered at ARA-I included hot cell operations, materials research, a small laboratory for sample preparation and inspection, a print shop, and a radiochemistry laboratory. It was also the staging area for the emergency response to the 1961 SL-1 accident and subsequent cleanup. The facility was shut down in 1988.

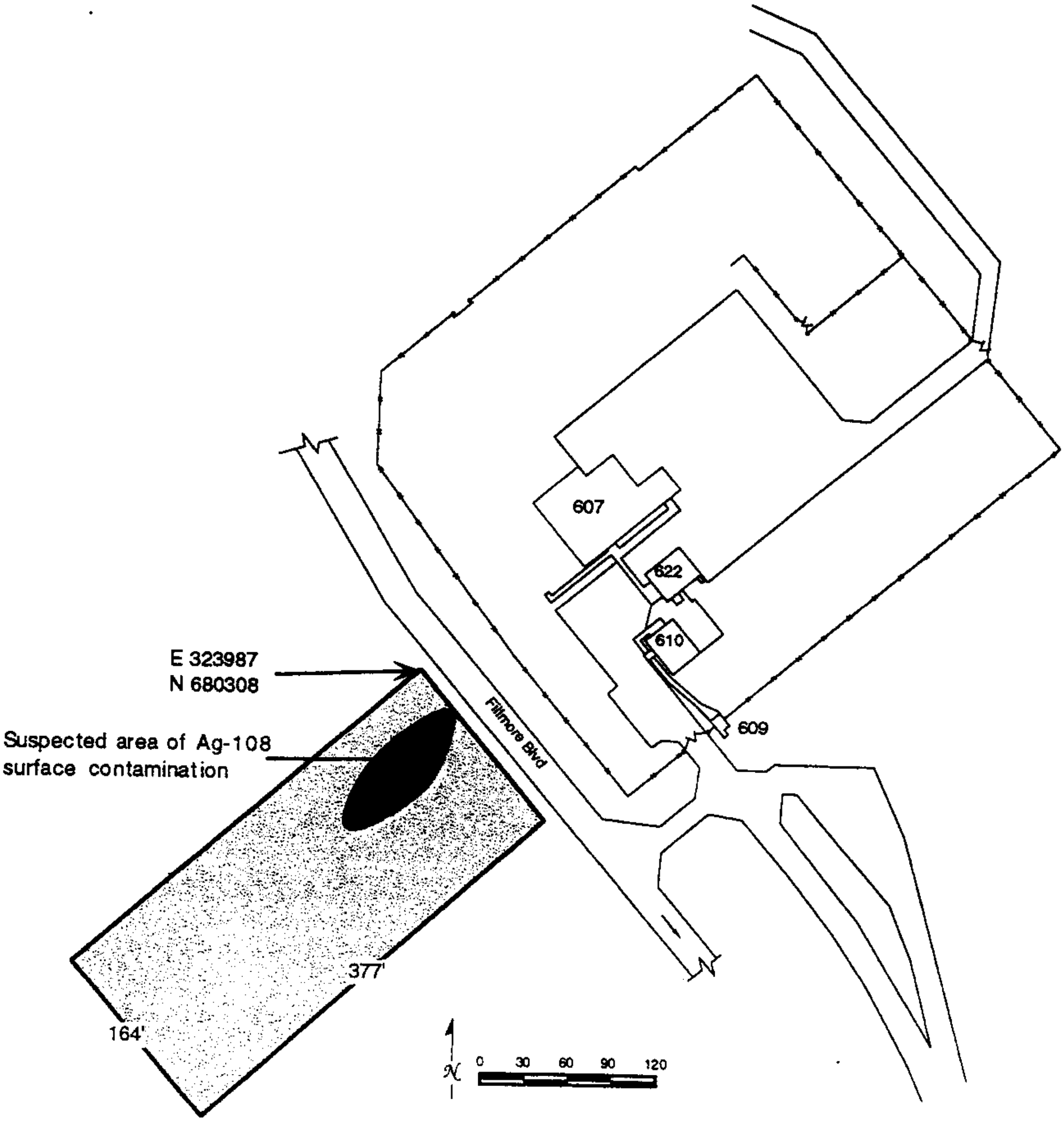

Figure 1-3. ARA-III radioactive waste leach pond, Site ARA-12.

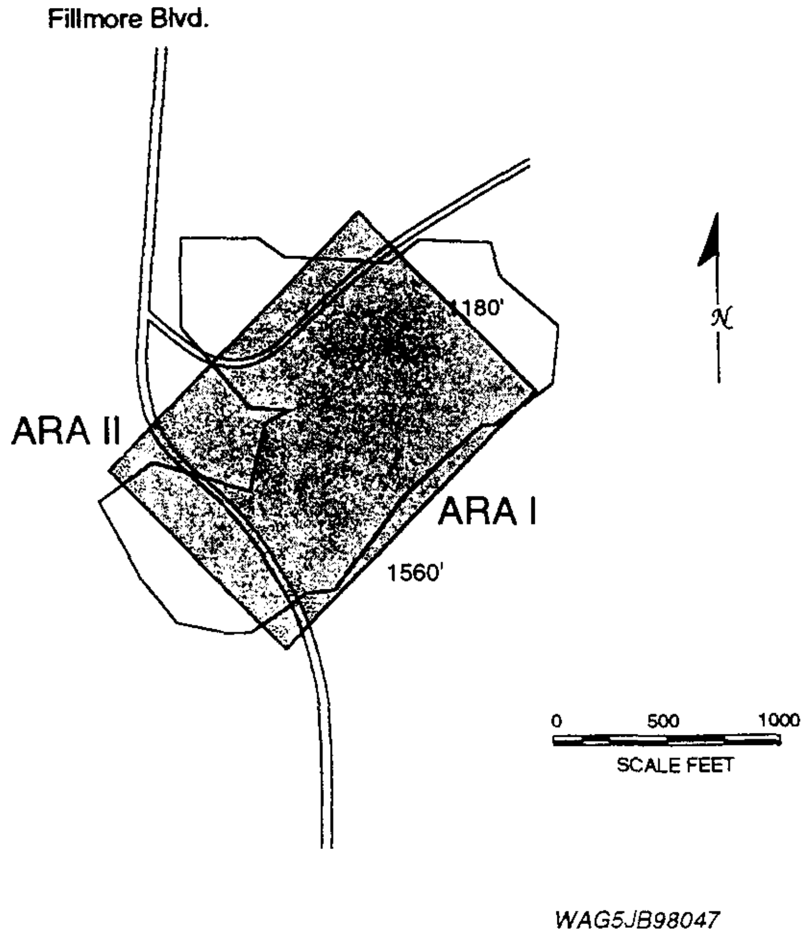

Figure 1-4. ARA-I and ARA-II contaminated soils and subsurface structures, Site ARA-23.

Also constructed about 1957, ARA-II housed the SL-1 reactor. The reactor was operated from August 1958 until January 3, 1961, when it was destroyed by an accidental nuclear excursion. Subsequent to decontamination, the three main buildings were converted to offices and welding shops. The facility also housed numerous minor structures such as a guardhouse, well house, chlorination building, decontamination and laydown building, power extrapolation building, electrical substation, and several storage tanks. The facility was shut down in 1986.

The soil from ARA-23 that will be used in the treatability study will come from two areas: (1) where the SL-1 equipment was decontaminated and (2) an adjacent area consisting of windblown contamination. The approximate combined volume to be treated from these two areas is 459 to 612 m^3 (600 to 800 yd^3). The two areas are considered to be a result of different depositional modes; therefore, the soils will be treated separately with all stockpiles maintained as such. The SL-1 decontamination area is considered a sediment depositional-type soil, and the other areas of ARA-23 as windblown. The GPRS data collected for ARA-23 shows significant spread of Cs-137 contamination, much of it exceeding 45 pCi/g.

Additional background information and data pertaining to ARA-23 can be found in the *Final Work Plan for Waste Area Group 5 Operable Unit 5-12 Comprehensive Remedial Investigation/Feasibility Study* (DOE-ID 1997a) and Engineering Design File (EDF)—*ARA Windblown Area Risk Evaluation* (LMITCO 1995a). Other radionuclides (i.e., Sr-90) are present but at concentrations below risk concerns. Prior to any soil excavation and treatment, a hazardous waste determination will be completed as per the requirements set forth in Management Control Procedure (MCP)-444, "Characterization Requirements for Solid and Hazardous Wastes" (LMITCO 1998a).

1.5.3 BORAX-02: Boiling Water Reactor Experiment-I

The BORAX-I was a small experimental reactor used in the summer months of 1953 and 1954 for testing boiling-water reactor technology. In 1954, the design mission of BORAX-I was completed, and the decision was made to make one final test, which resulted in the intentional destruction of the reactor. The destruction of the reactor contaminated approximately 7,800 m^2 (1.9 acres) of the surrounding terrain. Immediately following the final test of the BORAX-I, much of the radioactive debris, including some fuel residue, was collected and buried onsite in the reactor shield tank (see Figure 1-5). Recovered fuel fragments and fuel residue were sent to the INTEC (formerly the Idaho Chemical Processing Plant) at the INEEL and Oak Ridge National Laboratory in Tennessee. Reusable equipment associated with the reactor was successfully decontaminated and used in the construction of BORAX-II. However, the cleanup did not sufficiently reduce the radioactivity at the site; therefore, the 7,800-m^2 (1.9-acres) contaminated area was covered with approximately 15 cm (6 in.) of gravel to reduce radiation levels at the ground surface.

A portion of the BORAX-I area was remediated under terms of the *Record of Decision for Stationary Low-Power Reactor-1 Operable Unit 5-05 and Boiling Water Reactor Experiment-I Burial Grounds Operable Unit 6-01 and 10 No Action Sites (Operable Unit 5-01, 5-03, 5-04, and 5-11)* (DOE-ID 1996a). However, additional contamination was recently discovered in soils adjacent to the site. Approximately 153 m^3 (200 yd^3) of soil will be segregated pending agreement to treat by the agencies. This soil will represent windblown deposition. A 1998 GPRS survey of the BORAX-I site showed concentrations of Cs-137 ranging from background to greater than 45 pCi/g. Highest concentrations are located approximately 30 m (100 ft) south of the facility fence.

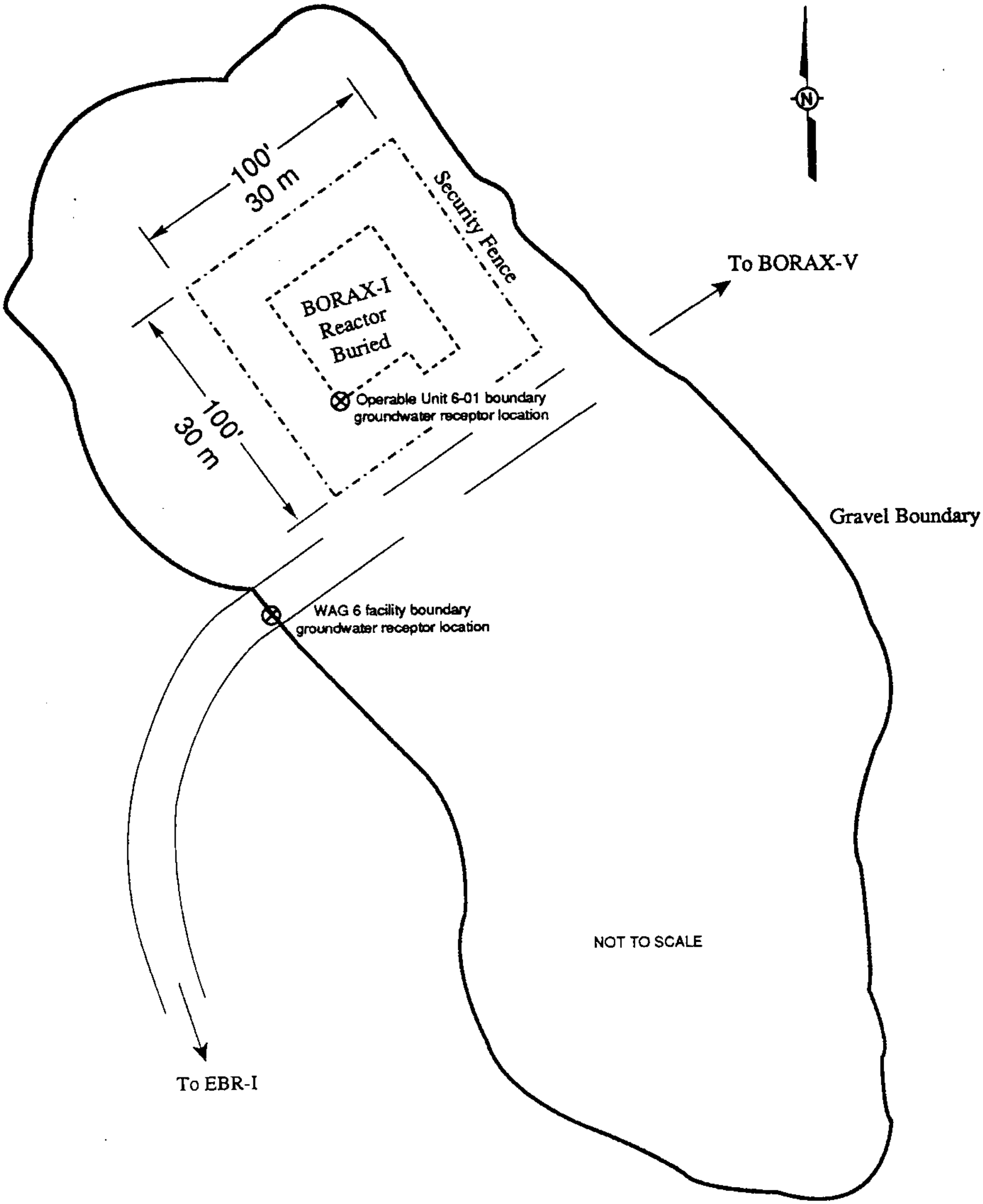

Figure 1-5. BORAX-I Burial Grounds.

Additional background information and data pertaining to BORAX-I can be found in the following documents:

- *Technical Memoranda Preliminary Baseline Risk Assessment for the Operable Units 5-05 and 6-01, SL-1 and BORAX-I Burial Grounds Remedial Investigation/Feasibility Study and Overview of Exposure Scenarios for Baseline Risk Assessment for the OU 5-05 and 6-01 Stationary Low-Power Reactor and Boiling Water Reactor Experiment-I Burial Grounds Remedial Investigation* (EG&G 1993)

- *RI/FS Scope of Work for Operable Units 5-05 and 6-01 (SL-1 and BORAX I Burial Grounds) Remedial Investigation Feasibility Study* (EG&G 1994)

- *Remedial Investigation/Feasibility Study Report for Operable Units 5-05 and 6-01 (SL-1 and BORAX I Burial Grounds)* (LMITCO 1995b)

- *Record of Decision Stationary Low-Power Reactor-1 and Boiling Water Reactor Experiment-I Burial Grounds (Operable Units 5-05 and 6-01) and 10 No Action Sites (Operable Units 5-01, 5-03, 5-04, and 5-11)* (DOE-ID 1996a)

- *Stationary Low-Power Reactor-1 and Boiling Water Reactor Experiment-I Burial Ground Engineered Barriers Project Remedial Design/Remedial Action Workplan Operable Unit 5-05/6-01* (DOE-ID 1996b).

Prior to any soil excavation and treatment, a hazardous waste determination will be completed as per the requirements set forth in MCP-444, "Characterization Requirements for Solid and Hazardous Wastes" (LMITCO 1998a).

1.5.4 ARA-06: Stationary Low-Power Reactor-1

The SL-1 was a small nuclear power plant designed for the military to generate electric power and heat for remote arctic installations. The reactor was operated from August 1958 until January 3, 1961 as a test, demonstration, and training facility. On the evening of January 3, 1961, the SL-1 reactor accidentally achieved a prompt critical nuclear reaction, which caused a steam explosion that destroyed the reactor and resulted in the deaths of the three operators on duty. The reactor vessel and building were severely damaged and highly contaminated, and a massive cleanup operation ensued to dismantle and dispose of the reactor and building.

A burial ground was constructed approximately 488 m (1,600 ft) northeast of the original site of the reactor (see Figure 1-6). This was done to minimize radiation exposure to the public and site workers that would have resulted from transport of contaminated debris from SL-1 to the RWMC over 26 km (16 mi) of public highway. Original cleanup of the site took about 18 months. The entire reactor building, contaminated materials from nearby buildings, and soil and gravel contaminated during cleanup operations were disposed in the burial ground. The majority of buried material consists of soils and gravel. Following studies of the reactor core itself, the reactor fuel was sent to INTEC for reprocessing, and the reactor core minus the fuel disposed at the RWMC. Some of the soils surrounding the SL-1 reactor burial ground may be treated to determine the volume reduction potential. Up to a maximum of 153 m^3 (200 yd^3) of soil will be treated. This soil will represent windblown deposition. As with ARA-23, the primary contaminant is Cs-137 with concentrations exceeding 45 pCi/g as determined with the GPRS measurement system.

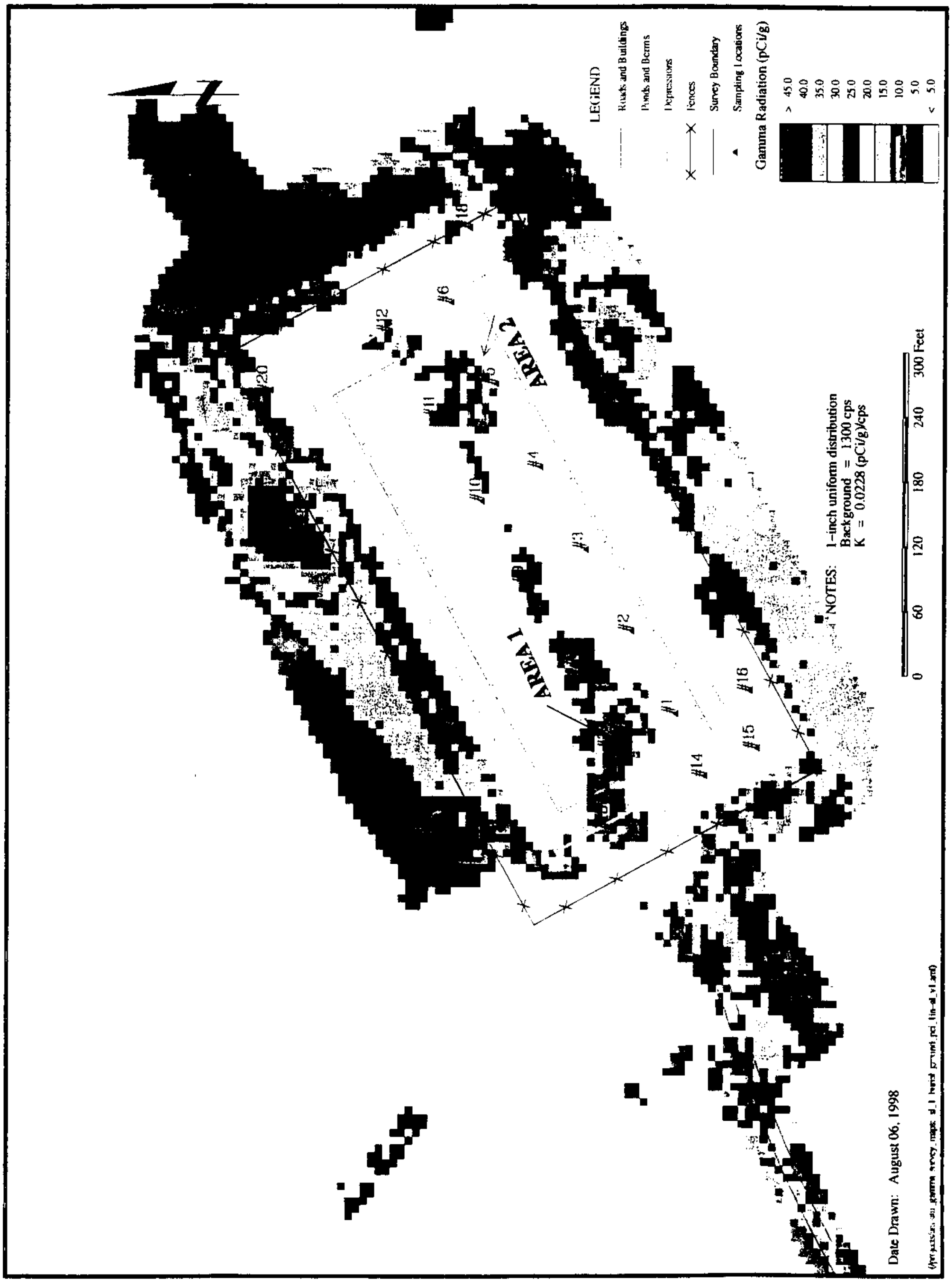

Figure 1-6. SL-1 Burial Grounds.

Additional background information and data pertaining to SL-1 can be found in the following documents:

- *Technical Memoranda Preliminary Baseline Risk Assessment for the Operable Units 5-05 and 6-01, SL-1 and BORAX-I Burial Grounds Remedial Investigation/Feasibility Study and Overview of Exposure Scenarios for Baseline Risk Assessment for the OU 5-05 and 6-01 Stationary Low-Power Reactor and Boiling Water Reactor Experiment-I Burial Grounds Remedial Investigation* (EG&G 1993)

- *RI/FS Scope of Work for Operable Units 5-05 and 6-01 (SL-1 and BORAX I Burial Grounds) Remedial Investigation Feasibility Study* (EG&G 1994)

- *Remedial Investigation/Feasibility Study Report for Operable Units 5-05 and 6-01 (SL-1 and BORAX I Burial Grounds)* (LMITCO 1995b)

- *Record of Decision Stationary Low-Power Reactor-1 and Boiling Water Reactor Experiment-I Burial Grounds (Operable Units 5-05 and 6-01) and 10 No Action Sites (Operable Units 5-01, 5-03, 5-04, and 5-11)* (DOE-ID 1996a)

- *Remedial Design Remedial Action (RD/RA) Scope of Work (SOW) for Stationary Low Power Reactor 1 (SL-1) & BORAX I Burial Grounds Engineered Barriers – OU 5-05 & 6-01* (LMITCO 1996a)

- *Stationary Low-Power Reactor-1 and Boiling Water Reactor Experiment-I Burial Ground Engineered Barriers Project Remedial Design/Remedial Action Workplan Operable Unit 5-05/6-01* (DOE-ID 1996b).

Prior to any soil excavation and treatment, a hazardous waste determination will be completed as per the requirements set forth in MCP-444, "Characterization Requirements for Solid and Hazardous Wastes" (LMITCO 1998a).

1.5.5 CPP-10: Idaho Nuclear Technology and Engineering Center

As a result of a break in a polyvinyl chloride line at the CPP-10 at INTEC, a release of 3,000 L (800 gal) of radioactively-contaminated basin water drained onto the CPP-603 shielded area floor. A small area (34.0 m^2 [366 ft^2]) of asphalt and soil outside the building was contaminated and has been designated as Site CPP-10. The area of the spill was decontaminated; however, sampling in one borehole at the site has indicated the presence of radionuclides. The *Final Preliminary Scoping Track 2 Summary Report for Operable Unit (OU) 3-09* (LMITCO 1995c) for the Track 2 investigation has been completed and recommended further evaluation in the WAG 3 comprehensive remedial investigation/feasibility study (RI/FS). Approximately 13 m^3 (17 yd^3) (i.e., one intermodal) will be processed by the segmented gate system to determine the volume reduction potential when used on a spill contaminated soil. The primary contaminant at CPP-10 is Cs-137 at a maximum concentration of 1,190 pCi/g. Refer to Figure 1-7 for the CPP-10 site location.

Additional background information and data pertaining to CPP-10 can be found in the following documents:

- *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL—Part A, RI/BRA Report (Final)* (DOE-ID 1997b)

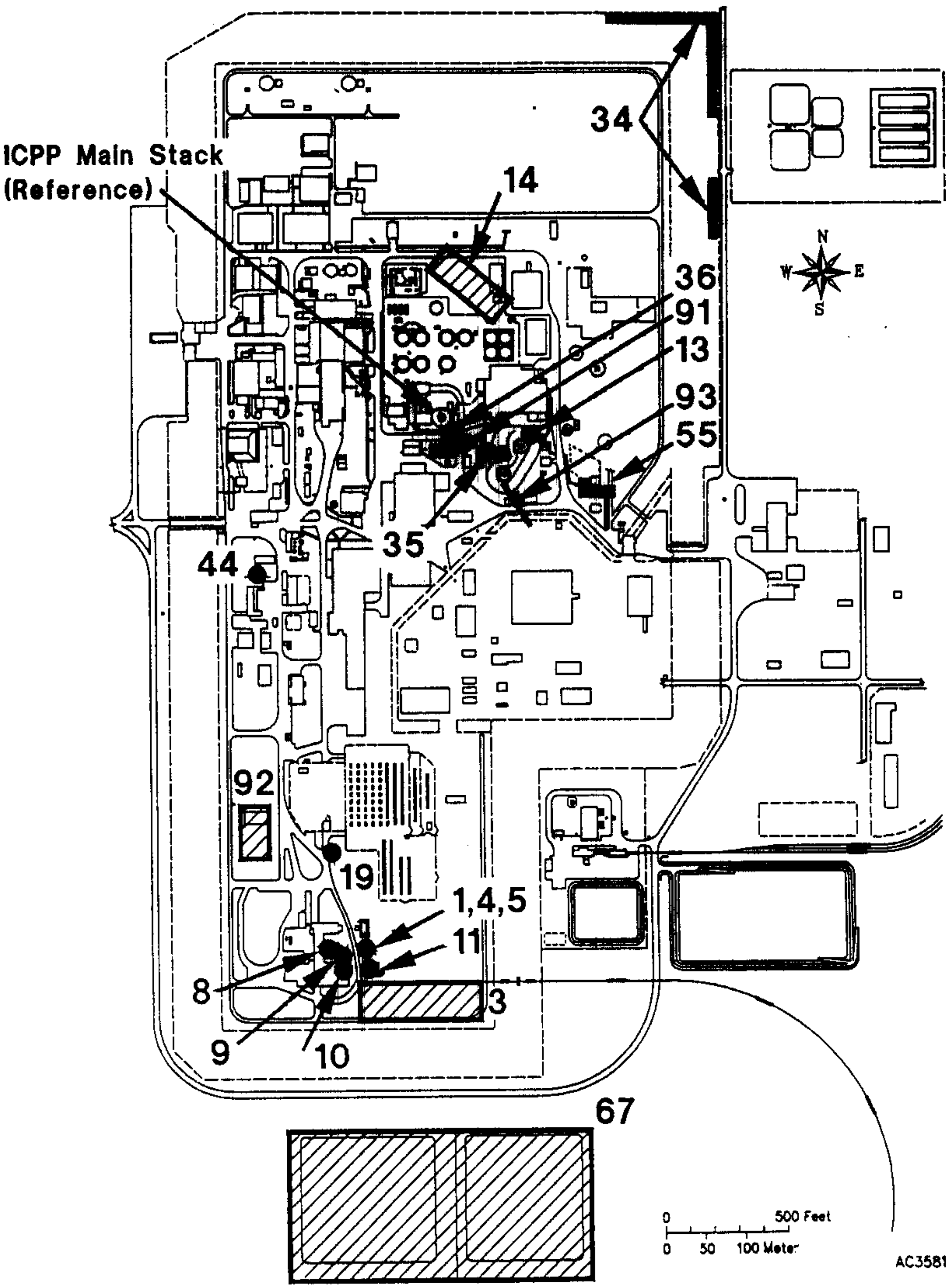

Figure 1-7. Operable units within WAG 3.

- *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL—Part B, FS Supplement (Final)* (DOE-ID 1998b)

- *Proposed Plan for Waste Area Group 3 at the Idaho Chemical Processing Plant Idaho National Engineering and Environmental Laboratory* (DOE-ID 1998a).

Refer to the above documents for recommendations pertaining to remediation of the site. Prior to any soil excavation and treatment, a hazardous waste determination will be completed as per the requirements set forth in MCP-444, "Characterization Requirements for Solid and Hazardous Wastes" (LMITCO 1998a).

1.5.6 CPP-03: Idaho Nuclear Technology and Engineering Center

Site CPP-03 is a 45.7 × 152 m (150 × 500 ft) temporary storage area southeast of CPP-603 that was used to store old and abandoned equipment, most of which was radionuclide contaminated. The storage area was decommissioned in the late 1970s. All stored material was boxed and sent to the RWMC. In addition, contaminated soil was removed, boxed, and sent to the RWMC, and the area covered with 28 cm (11 in.) of "cold" soil. Subsequently, 9,175 m^3 (12,000 yd^3) of contaminated soil excavated from the INTEC Tank Farm was stockpiled at this location prior to burial in three trenches located in the northeast corner of INTEC. Radiological surveys in the area have indicated activity levels above background, and sampling was conducted from three boreholes in the area. The Track 2 investigation has been completed and recommended further evaluation in the WAG 3 comprehensive RI/FS. Approximately 13 m^3 (17 yd^3) of soil will be processed by the segmented gate system to determine the volume reduction potential for soils found near CPP-03. This soil will represent windblown deposition. Refer to Figure 1-7 for the CPP-03 site location.

Additional background information and data pertaining to CPP-03 can be found in the following documents:

- *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL—Part A, RI/BRA Report (Final)* (DOE-ID 1997b)

- *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL—Part B, FS Supplement Report (Final)* (DOE-ID 1998b)

- *Proposed Plan for Waste Area Group 3 at the Idaho Chemical Processing Plant Idaho National Engineering and Environmental Laboratory* (DOE-ID 1998a).

Refer to the above documents for recommendations pertaining to remediation of the site. Prior to any soil excavation and treatment, a hazardous waste determination will be completed as per the requirements set forth in MCP-444, "Characterization Requirements for Solid and Hazardous Waste" (LMITCO 1998a).

At one time, radionuclide-contaminated soils resulting from an excavation at INTEC were stored at CPP-03. Subsequently, these soils were removed and buried in what is now CPP-34. However, there is concern that contamination resulting from these soils may be present on the surface of CPP-03. As noted in *Track 1 Investigation of CPP-34, Soil Storage Area in the NE Corner of ICPP-Action Determination, Track 2 Treatability Study* (WINCO 1994), soil boring samples were collected from CPP-34 by Golder Associated and submitted for radionuclide analyses. These analyses showed that Pu-238 (5.1 pCi/g) and Np-237 (0.7 pCi/g) were present in only one sample at fairly low concentrations. Low concentrations of uranium isotopes were also detected at concentrations near and at background. The one radionuclide of possible concern is Sr-90, which was detected in one borehole at a concentration of 6,000 pCi/g. Because of this one detect of Sr-90, the post treatment samples of "clean" and contaminated soils will also be submitted for Sr-90 analysis. Based upon information contained in the comprehensive RI/FS, the primary contaminant remaining at CPP-03 is Cs-137 at a maximum concentration of 65.1 pCi/g. In addition, it should be noted that soils from INTEC will be returned to that site for final disposition.

1.5.7 ARA-25: Contaminated Soils Under the ARA-I Hot Cell

The ARA-25 site is a newly identified potential waste site not originally identified in the FFA/CO Action Plan, but has recently been approved as a new site. As part of the ongoing D&D activities at ARA-I, radionuclide-contaminated concrete floor slabs were cut out of the ARA-626 Hot Cells (Cell No. 1 and 2). Because the concrete was poured directly on the soil, the underside of the slabs (approximately 15 cm [6 in.] thick) was covered completely with soil. A radiological evaluation by radiation control (RADCON) personnel was performed on the soils that sloughed off the underside of these concrete slabs, and on the rebar protruding out of the concrete. The initial contamination levels were determined by the radiological control technician (RCT) to be 50,000 disintegrations per minute (dpm) on the soils and the concrete rebar. However, this determination was difficult to verify because of the radioactive shine from the topside of the hot cell floor slabs.

Subsequent radiological surveying was performed in June 1998, during which soil immediately adjacent to the hot cell floor drains (i.e., beneath the slabs and at the base of the exposed floor drains) was removed and surveyed. The results of the survey showed soil next the the floor drain in Cell No. 1 to be greater than 500,000 dpm beta/gamma as determined with the Ludlum 2A detector, and greater than 15 mR/hr as determined with the Eberline ion chamber RO20 instrument. Outlying soils (those away from the drain area) beneath the slab area of this hot cell were surveyed at 8,000 to 12,000 dpm. Contamination levels of soils beneath the floor slab from Cell No. 2 were not as high as the levels found for those underlying Cell No. 1. Soil collected from the base of the floor drain was surveyed at 10,000 dpm. Contamination readings of the soils away from the floor drain for this cell were in the 5,000 dpm range.

Sampling of the soils was conducted in July 1998, and unvalidated data are being received at this time. A summary of the unvalidated data is provided in Table 1-1. Initial results do not reveal any RCRA-listed or characteristic constituents. Since the soils are near a drain that fed the ARA-729 tank that contains a listed mixed waste, it is possible a no-longer contained-in determination may have to be approved by IDHW prior to this soil becoming a candidate for testing. The need for a no-longer contained-in determination will depend on the conclusions reached in the hazardous waste determination. If a no-longer contained-in determination is required and subsequently approved by IDHW before deployment, the soil will be processed by the segmented gate system. Tentatively, May 1, 1999 is the date by which the determination must be received for ARA-25 to be included in this study.

This soil will represent a third depositional mode—contaminated soil from a spill. Approximately 13 m^3 (17 yd^3) of soil will be processed.

Table 1-1. ARA-25 unvalidated data summary.

Contaminant	Maximum Concentration[a]	Number of Samples	Waste Code	Laboratory Flag[b]	Comments
Trichloroethene	0.005 mg/L	4	F001	U	Below 0.5 mg/L regulatory level
1,1,1-trichloroethane	0.005 mg/kg	4	F002	U	Below 7,000 mg/kg risk-based concentration level
Methylene chloride	0.005 mg/kg	4	F002	U	Below 8,500 mg/kg risk-based concentration level
Toluene	0.022 mg/kg	6	F005	None	Below 16,000 mg/kg risk-based concentration level
PCBs	0.067 ppm	6	NA	U	Below TSCA standard of <50 ppm as-found concentration
Arsenc	0.012 mg/L	3	NA	B	Below 5.0 mg/L regulatory level
Barium	0.892 mg/L	3	NA	B	Below 100 g/L regulatory level
Cadmium	0.00978 mg/L	3	NA	U	Below 1.0 mg/L regulatory level
Chromium	0.00663 mg/L	3	NA	U	Below 5.0 mg/L regulatory level
Lead	0.0416 mg/L	3	NA	U	Below 5.0 mg/L regulatory level
Selenium	0.0177 mg/L	3	NA	U	Below 1.0 mg/L regulatory level
Silver	0.0053 mg/L	3	NA	B	Below 5.0 mg/L regulatory level
Mercury	0.00026 mg/L	3	NA	B	Below 0.2 mg/L regulatory level

a. Results in mg/L are from toxicity characteristic leaching procedure (TCLP) extract analysis. Results in mg/kg and ppm are totals.

b. U = not detected, B = blank.

PCB = polychlorinated biphenyl

NA = not applicable

TSCA = Toxic Substance Control Act